Space Weather Forecast

Issued on Tuesday, 25 April 2023 at 13:08 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Waning Coronal Mass Ejection (CME) effects with G1/Minor Storm risk Day 1 (25 Apr), further CME possible Day 3 (27 Apr) with G1/Minor-G2/Moderate Storm risk. Slight chance of M-class flares (R1-R2 Minor-Moderate radio blackouts) throughout. Chance of Active fluence.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with frequent minor Common-class flares observed. There are currently seven sunspot regions on the visible disc. The largest region is approaching the northwest limb and is no longer fully visible. A region in the southeast is the second largest and remains generally stable. One rapidly developing medium region in the southeast is becoming increasingly complex and will be monitored for further development. The remaining sunspot regions are all generally small and simple.

An eruption occurred from near south centre disc, starting around 24/1300 UTC. The Coronal Mass Ejection (CME) has been observed in coronagraph imagery heading mostly south, but an Earth directed component is likely, with this potentially reaching Earth early on 27 April.

Solar Wind / Geomagnetic Activity: The solar wind continues to show the influence of a Coronal Mass Ejection (CME) arrival at 23/1700 UTC. After a brief period of strong winds, the wind speed has been predominantly at elevated levels. The solar wind is currently around 520 km/s and is showing slow and steady decline. The Interplanetary Magnetic Field was initially strong, but has steadily declined and has been at weak levels since 25/0030 UTC. The important north-south component was initially strong and northward directed. It is now weak and fluctuating, although remaining mostly northward directed. Geomagnetic activity started the period at Active levels, but gradually eased and is now at Quiet to Unsettled levels.

Energetic Particles / Solar Radiation: Solar radiation has been at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is most likely to remain Low, with a slight chance of becoming Moderate.

Solar Wind / Geomagnetic Activity: Earth is currently experiencing impacts from the Coronal Mass Ejection (CME) which left the Sun on 21 Apr, with solar winds currently at elevated levels. Another CME occurred on 24 Apr, with an Earth-directed component potentially reaching Earth either late on Day 2 (26 April), but more likely early on Day 3 (27 April). Solar winds are likely to gradually ease through Day 1 (25 Apr) as the current CME effects wane. A stream of fast winds from a coronal hole are likely to arrive during Day 2, with wind speeds reaching up to 550-600 km/s.

Geomagnetic activity is currently Quiet to Unsettled (Kp 0-2), but there is a slight chance of a further G1/Minor Storm interval on Day 1 if the important north-south component becomes strongly oriented southward. Activity is then expected to remain Quiet to Unsettled until the arrival of the fast solar winds Day 2 and the possible glancing blow from a CME later Day 2 or

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early Day 3. At this point, activity is likely to become Active to G1/Minor Storm, with a slight chance of G2/Moderate Storm intervals on Day 3. Activity returning to Quiet or Unsettled during Day 4 (28 Apr).

Energetic Particles / Solar Radiation: Solar radiation is currently at background levels, with a slight chance of rising to reach the S1/Minor Storm level, should any effects occur from the recent CME which left the Sun on 24 Apr, or with any larger solar flares.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	20	50	10
Strong	G3	No	1	1	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	15	15	15	15
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	3
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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